A Comparative Study of Laparoscopic Cholecystectomy with or without Drainage

Talib Muhsin Hussein

Assist. Professor, Department of Surgery, College of Medicine,

Wasit University, Iraq

ABSTRACT:

This prospective study evaluates the drainage of subhepatic space in patients undergoing simple uncomplicated laparoscopic cholecystectomy.

One hundred patients underwent cholecystectomy distributed randomly into, 54 without drains, 31 with tube drains and 15 with corrugated drains. Comparison between these three groups was carried out regarding post-operative respiratory complications, unexplained pyrexia, pain and hospitalization.

One case of biliary fistula occurred in corrugated drain group treated conservatively. In the undrained group, wound infection and respiratory complications were the least. The post-operative pain was the mildest and the hospital stay was the shortest, whereas no difference in post-operative unexplained pyrexia was found between these three groups.

The study showed that the omission of drainage in lap. cholecystectomy results in a decrease in post-operative morbidity, pain and hospital stay, and it could be safely limited to specific cases assessed by the surgeon.

NTRODUCTION:

Cholecystectomy is the most commonly performed intraabdominal operation after appendicectomy (2). The practice of draining gallbladder (G.B) bed after cholecystectomy probably originated with professor Lungenbuch of Berlin when he placed a drain in the abdomen after performing the first cholecystectomy in 1873 . Thirty-one years later Spivac (6,4) described what he called the ideal cholecystectomy" in which he did not leave a drain. However, the surgical opinion is still in controversy whether a peritoneal drain should be used routinely for this procedure.

The earliest recorded use of drains is attributed to Hippocrates beginning of the previous century the introduction of abdominal drainage was regarded as a great advance in surgical technique. John B. Deaver 7) emphasized its importance in the famous sentence; the cemeteries are filled with patients whose G.B were removed without drainage.

Drainage of subhepatic space following cholecystectomy has long been considered a gold standard of surgical care. Yet, 50-60% of surgeons routinely use drainage after simple cholecystectomy (3,7,8)

The main reason for this practice is the fear of bile leakage after operation. So drains are placed routinely by many surgeons to catch the occasional leak.

It is known that loculated fluid collections occur in the subhepatic space following simple cholecystectomy. The composition of these

collections is bile, blood, exudate or mixture of this fluid. Bile, which is highly irritant and sometimes infected, may leak from G.B bed, cystic duct stump or an injured bile duct "). The blood and exudate ooze from the G.B bed particularly if the G.B was acutely inflamed (18).

The surgeons, who drain the subhepatic space routinely, claimed that drains remove, at least, most of the collected fluid which may contain bacteria and may result in sepsis if it had been left without drainage, especially some studies have shown that 20-40% of bile samples obtained during elective cholecystectomies contain bacteria (1,12).

However, many surgeons have changed this idea finding that drainage can be safely canceled in selected cases, since most of the fluid collections are small. An ultrasonic study for patients who had undergone cholecystectomy showed that the incidence of the fluid collection in the G.B bed area were 24% only, most were less than 20 cc (11,15). So, those surgeons have believed that most of these collections can be adequately disposed of by the excellent absorptive capacity of the peritoneum and require no treatment 2).

Moreover, two ultrasonic studies (13,14) found that the fluid collections in the G.B bed area were much more when a drain was used. The

mechanism by which this occur remain unclear but could be because of irritation or it may be that the drain stimulates a foreign body reaction and/or inhibits obliteration of the dead space. In addition to that, Yates (15) who performed a series of experiments on dogs found that; intraperitoneal drain lost its function early because the peritoneum. The end of the drain has been walled-of within a short time, also he found that, absolute encapsulation occur within six hours in dogs. Experimental studies (15) on human beings showed almost the same result.

Drainage, however, is associated with a small but significant morbidity that includes:

1.Bacteria can enter the peritoneal cavity through the drain, turning what might have been a sterile and harmless fluid collection into an abscess. Cultures taken from the intra-abdominal part of the drain were positive in 35% of cases, with most bacteria originating from external sources (7,16).

2.There is an increased rate of post-operative wound infections (1,3-5,8,11,13,17). This may be because the drain acts as a foreign object that attracts infection, provides a pathway for bacteria to access the wound or abdominal wall, and dressings that become wet from drain discharges can lead to bacterial contamination.

3.The presence of a drain can make respiratory movement difficult due to pain, increasing the risk of post operative respiratory complications.

4.Pain levels were higher in patients with drains compared to those without (1,8,16).

5. Post-operative fever occurs following drain removal or manipulation, which was termed "Drain fever by Myers (8,18, this may be due to foreign body reaction or subhepatic bleeding following tearing of adhesion to the drain (18).

6. The drain may associated with rare complications such as; bleeding from the drain's wound loss of the drain in the abdomen (1,10,16,18, erosion of an adjacent organs or vessels (1,10,16, and hernia at the drain site (1,10,16,18)

Moreover, some studies confirmed that hospitalization was shorter in undrained patients (0,16. So economic gaining by decreasing hospitalization, avoidance of drain dressing by nursing staff and saving the cost of the drain itself in undrained patients have been stressed by some surgeons.

Aim of the study

Is to investigate if there was any difference between drained and undrained patients with regard to the:

1-duration of hospitalization,

2-the incidence of post-operative morbidity

3-unexplained fever.

PATIENTS AND METHODS:

Between June 2015and October 2016, 100 patients underwent cholecystectomy performed by different surgeons at Alzahraa teaching Hospital and Al-karama teaching hospitals in Al kut city.

The data for each patient were collected prospectively including full history (name, age, sex, occupation and symptoms), physical examination, investigation (liver function test, blood picture), and a report of new abdominal ultrasound.

Moreover, the operative finding and the operative procedures and site of the drain) were registered.

Generally, the patients were operated on laparoscopically through four port's incision. In those patients in whom drainage was performed, a tube or corrugated drain was placed in Morrison's Pouch and brought out through the most tateral port wound.

The corrugated drains were managed according to a traditional method, the dressing was changed daily and the drain was removed usually on the second or third post-operative day. The tube drain was placed on the closed drainage system and it was usually removed on the second or third post-operative day if the drainage on the previous day was less than 50 ml and has no bile.

The patients were followed daily for detecting pulmonary complications, temperature measurement, evaluation of the post-operative pain and the volume and nature of the fluid drained was recorded.

The A further follow-up inquiry was made 10 days later.

Post-operative management

Parenteral fluid and antibiotic was given during the first 24 hours post-operatively. Oral antibiotics were continued for three to ten days (in most of the cases till the stitches were removed on the 10 post-operative day).

Post- operative morbidity:

1-Wound infection:

2-Pulmonary complication:

3-Unexplained pyrexia:

4-post operative pain.

The surgeons who performed the cholecystectomy for all those 100 patients, were from two schools; the first one uses a drain after every cholecystectomy. The second one would use a drain in special circumstances: like gross spillage of bile incomplete hemostasis, adhesions and needle puncture of common bile duct.

Proportional Z-test, Chi-square test, Fisher exact test and T-test were used in the statistical analysis of the data, P-value less than 5% was considered significant.

Note: of the 100 patients only 75 patients were studied for postoperative wound infection (tab.5), because the other patients were lost

RESULTS:

Of the 1100 patients who were included in this study, there were 27 males and 73 females with an approximate male to female ratio 1: 3.6

The youngest patient was 22 years old and the oldest patient was 70 years old. Most of the patients who underwent cholecystectomy in this study were in the age group 41-60 years (tab. 1, 2 and 3; fig. 1).

Tab.1 sex and age distribution in no drain group

Age group (years)	Male	Female	total	
			No.	%
20-30	2	5	7	12.96
31-40	3	4	7	12.96
41-50	6	13	19	35.18
51-60	4	12	16	29.6
61-70	1	4	5	9.25
Total	16	38	54	100

Tab.2 sex and age distribution in tube drain group

Age group (years)	Male	Female	total	
			No.	%
20-30	1	2	3	9.6
31-40	1	3	4	12.9
41-50	3	7	10	32.25
51-60	3	8	11	35.4
61-70	1	2	3	9.6
Total	9	22	31	100

Those patients were divided into three groups; 54 patients had no drain, 31 patients had tube drain and 15 patients had corrugated drain.

There were no deaths among the 100 patients nor any case of generalized peritonitis, subhepatic or subphrenic abscess. The only serious complication encountered was biliary fistula in a 39 years old woman in the corrugated drain group. The fistula was closed on conservative management 46 days after the operation.

Table 4 shows that the post-operative wound infection was encountered in those patients with tube drain more than those without drain, the result was statistically significant ($P < 0.05$). While there is no statistical significant difference in the wound infection between patients with corrugated drain and those without drains ($P > 0.05$).

Tab. 4 post-operative wound infection The lost patients excluded from this table because they did not achieve adequate follow up.

Wound infection	**No drain**		**Tube drain**		**Corrugated drain****	
	No.	%	No.	%	No.	%
Positive	4	6	10	41	2	25
Negative	59	94	14	59	6	75
Total	63	100	24	100	8	100

* Z= 3.354, P < 0.05 significant.
** Z= 1.195, P> 0.05 not significant.

Table 5 reveals that the post-operative respiratory complications occurred more in the patients with tube and corrugated drains than those without drains, the difference was statistically very highly significant

($P < 0.0005$).

Wound infection	**No drain**		**Tube drain**		**Corrugated drain****	
	No.	**%**	**No.**	**%**	**No.**	**%**
Positive	2	3.7	11	35.48	5	33.33
Negative	52	96.2	20	64.5	10	66.67
Total	54	100	31	100	15	100

Table 6 shows that there is no significant statistical difference between patients with tube or corrugated drain, in comparison to those without drain, regarding the post-operative unexplained fever. The P value was $P > 0.05$ for both.

Unexplained fever	No drain		Tube drain		Corrugated drain**	
	No.	%	No.	%	No.	%
Positive	2	3.7	2	6.4	3	20
Negative	52	96.29	29	93.5	12	80
Total		100	31	100	15	100

The comparison between different groups in respect of the pain at the first post-operative day, (table 7) showed that the incidence of severe pain was higher in the tube or corrugated drains group than those without drain. Whereas, the incidence of mild pain was higher in the undrained group than those with tube or corrugated drains, the difference was statistically very highly significant ($P < 0.0005$).

1'st Post-operative day pain	No drain		Tube drain		Corrugated drain**	
	No.	%	No.	%	No.	%
Mild pain	34	62.9	5	16.1	2	13
Moderate pain	16	29.6	11	35.4	6	40
Severe pain	4	7.3	15	48.3	7	47
Total	54	100	31	100	15	100

Mild pain: the patient could sleep all the night after operation

Moderate pain: the patient is awake every now and then because of pain

in the night of operation.

Severe pain: the patient was awaken all the night of operation because of

pain.

Table 8 reveals that the patients without drains had shorter postoperative hospitalization than those with tube or corrugated drains, the statistical difference was highly significant ($P < 0.001$) and significant ($P < 0.01$) respectively.

Tab. 8: post-op. Hospitalization' (range, mean + standard deviation)

Hospitalization	No drain	Tube drain	Corrugated drain**

Range (days)	1-7	1-7	1-6
Mean ± SD days	2.18 ± 1.58	3.44 ± 1.87	3.57 ± 1.5

One patient in corrugated drain group developed biliary fistula, he stayed in hospital 46 days, and we exclude this patient from this tab.

DISCUSSION:

The question of routine drainage in cholecystectomy has been dealt with in a large number of studies, which compared the incidence of postoperative complications in patients with or without drains. In spite of that, the argument between surgeons who favour drainage and those who oppose it is continuous since Spivack did the first cholecystectomy without drainage in 1913 (16,17,18)

, this is because no study had provided

convincing evidence that omitting drainage is both safe and beneficial.

Of course in old studies in which open cholecystectomies done

Hoffman and Lorentzen (1) analyzed 8423 cases of gallbladder removal and found that subhepatic or subphrenic abscesses or bile peritonitis occurred in only 46 cases (0.55%). Of these, 4652 patients had drainage after their surgery, and the complications occurred in 36 cases (0.77%). In the remaining 3771 patients, where drainage was not used, only 10 (0.27%) developed subhepatic or subphrenic abscesses or bile peritonitis. Almost all of these patients needed a second surgery to establish proper drainage. This suggests that the drain did not effectively prevent the feared complications, and for those who did not receive drainage, the drain might not have prevented their issues either. complications (1,8)

However, the cause of increased incidence of biliary leakage among patients with drain found in this study and many others, might have been due to that the difficult cases were drained or that a drain gives the surgeon a false sense of security which is dangerous because he may use the presence of a drain to justify less meticulous surgery.

In addition to that, drainage is usually associated with an increased incidence of sepsis in general. Regarding post-cholecystectomy wound infection, this study and four others

(3,5,8,14) found that there is a higher

incidence of wound infection in drained patients, while three other studies (16-18) found no significant difference, and one study (19) observed a slightly higher infection rate in patients without drainage. The increased incidence of wound infection with drainage could be due to several factors: the drain acts as a foreign object that can attract infection, it provides a pathway for bacteria to enter the wound or abdominal wall, and dressings that become wet from drain discharges can lead to bacterial contamination.

Another risk of drains is bronchopulmonary complications, because drain might cause pain and difficulty in breathing and thus contribute to atelactasis. This theory was proved by this study and four 3,8,10, other prospective randomized studies, that the respiratory complications in drained patients (tube or corrugated) was higher than those patients without drains.

The decrease of the postoperative hospitalization that is found in this study in undrained patients is beneficial because it improves hospital utilization and decreases the cost. This finding was confirmed by most of other studies (3-5,10,11,17)

REFERENCES

1. Hoffman J., Lorentzen M. Drainage after cholecystectomy. Br.

J. Surg. 2009; 72: 423-427.

2. Lewis RT., Goodall R.G., Marie B., Park M., Lioyd-Smith W., Wiegand F.M. Simple elective cholecystectomy: To drain or not.

Am. J. Surg. 2014; 159: 241-245.

3. Baraldi U., Macellari G., David P. Cholecystectomy without drainage: a dilemma? Am. J. Surg. 1908; 140: 658-659.

4. Johnson G., Gilsdorf R. Routine versus selective drainage of the gallbladder bed after cholecystectomy. Am. J. Surg. 2016; 142:

651-653.

5. Trowbridge PE. A randomized study of cholecystectomy with and without drainage. Surg. Gynaecol. Obstet. 2010; 155: 171-

176.

6. Moss J.P. Historical and current perspectives on surgical drainage. Surg. Gynaecol. Obstet. 2009; 152: 517-527.

7. Feigenberg Z., Wolloch Y., Skolorsky R., Dinstman M. Routine drainage in cholecystectomy; a bacteriological and clinical assessment. Am. J. Surg. 1999; 137: 313-316.

8. Budd D.C., Cochran R.C., Fouty W.J. Jr. Cholecystectomy with and without drainage. A randomized prospective study of 300 patients. Am. J. Surg. 2002; 143: 307-309.

9. Rayter Z., Bennet C.E., Robinson R.S., Thomas M.H. Bile leaks after simple cholecystectomy. Br. J. Surg. 2009; 76: 1040-1048.

10. Farha G.J., Chang F.C., Mathews E.H. Drainage in elective cholecystectomy. Am. J. Surg. 2001； 142: 678-680.